

### **ABSTRACT OF THE INVENTION**

A functionalized polymer for binding a dissolved molecule in an aqueous solution is presented. The polymer has a backbone polymer to which one or more functional groups are covalently linked. The backbone polymer can be such polymers as polyethylenimine, polyvinylamine, polyallylamine, and polypropylamine. These polymers are generally water-soluble, but can be insoluble when cross-linked. The functional group can be for example diol derivatives, polyol derivatives, thiol and dithiol derivatives, guest-host groups, affinity groups, beta-diphosphonic acids, and beta-diamides

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